

Photoluminescence from rice and starchy things for a fiber-optic sensor application

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Fiber-optic sensors using photoluminescence from sensor materials are potentially useful technique for the non-destructive, non-contact and remote measurements without any influences of electro-magnetic environment. Many fiber-optic sensors, such as a thermometer based on the fluorescence decay, a thermometer using thermal black body radiation, a fiber-optic pH sensor and a fiber-optic oxygen sensor have been reported in past ten years. In this paper, visible photoluminescence (PL) from polished rice and some other starches were evaluated for the future applications of fiber-optic sensor in a proof and a quality control of the foods.

The visible PL with broad peak at wavelength of $\lambda=460$ nm are observed from polished rice, flour and corn starch under illumination of ultra-violet (UV) light. Figure 1 shows emission and excitation spectra from polished rice. Visible PL is also seen in boiled rice. PL peaking at $\lambda=462$ nm is excited effectively with UV light at $\lambda=365$ nm. Although, peak wavelength dose not vary, peak intensity vary with kind of the rice specimens.

Figure 2 shows PL spectra from polished rice, flour and corn powder. In the figure, specimens are excited with UV light at $\lambda=365$ nm. The peak intensity and/or peak shape of PL varies with the kind of the starches, such as polished rice, flour, maize flour (corn powder). Intensities of shoulder part of the PL peak at $\lambda=420$ nm and $\lambda=550$ nm vary with kind of the starches.

From emission and excitation spectra, excitation using UV-LED, (wavelength at $\lambda=365$ nm) is found to be

effective for the evaluation of visible PL from polished rice and other starches. The visible PL over the wavelength from 400 to 600 nm observed using a equipment including UV-LED excitation may be potentially applicable to the optical evaluation of the starches.

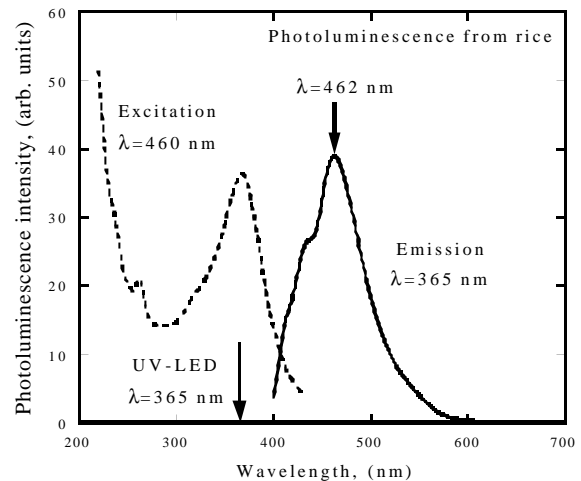


Fig. 1. Emission and excitation spectra from a polished rice (Koshihikari).

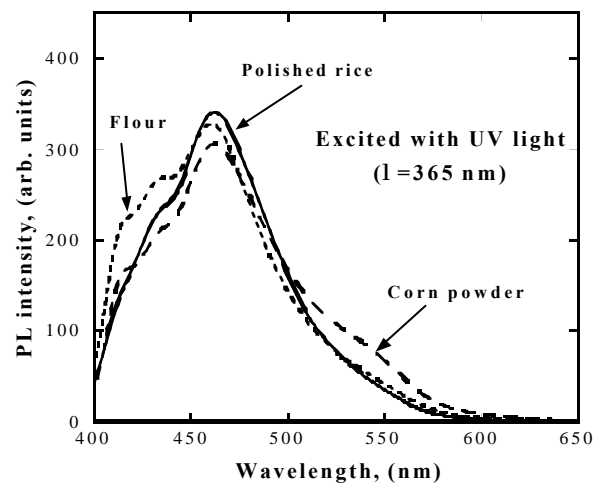


Fig. 2. Photoluminescence from polished rice, flour and corn starch. Specimens are excited with UV light at $\lambda=365$ nm